CLAIMS:

1. An extrusion apparatus comprising:

an interleaving block portion including at least two first chambers including:

an input aperture;

an output aperture wider and shorter in height than the input aperture and defining a series of first distances from the input aperture to points along the output aperture;

a width dimension;

a length dimension, wherein the length dimension of the first chambers are generally parallel;

a height dimension; and

a die portion having a laminate chamber having a height dimension disposed generally perpendicular to the length dimension of the first chambers, an output disposed at one end of the height dimension, the laminate chamber disposed so as to be in communication with the output apertures of the parallel first chambers.

2. The apparatus of claim 1 wherein the interleaving block further comprises:

an output aperture second distance extending between the output aperture and the laminate chamber along the width of each output aperture, such that as the first distance increases from the input aperture to points along the output aperture, the second length distance from each point along the output aperture decreases in length.

3. The apparatus of claim 1 wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

wherein the width of each first chamber is disposed generally perpendicular with respect to the height dimension of the interleaving block; and

wherein the height of the output aperture for each first chamber is

incrementally smaller from each first chamber output aperture to an adjacent first chamber output aperture along the height dimension of the interleaving block.

4. The apparatus of claim 3, wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each output aperture incrementally decreases in height from a top first chamber to a bottom first chamber.

5. The apparatus of claim 1, wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

a second distance extending between each output aperture and the laminate chamber, wherein the second distance can vary along the width of each output aperture; and

wherein the second distance for each first chamber output aperture incrementally changes along the height dimension of the interleaving block from each first chamber output to an adjacent first chamber output aperture at corresponding points of each output aperture.

6. The apparatus of claim 5, wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each corresponding second distance increases from a top first chamber to a bottom first chamber.

7. The apparatus of claim 1 wherein flowable material introduced at the input aperture exits the chamber through the output aperture at a substantially constant flow rate at any point along the width of the output aperture.

8. The apparatus of claim 1, wherein a width dimension of an output opening of the laminate chamber and the width dimension of at least one output aperture of the first chambers is substantially the same.

9. The apparatus of claim 1 wherein each first chamber input is in communication with a common supply.

10. The apparatus of claim 1 wherein an output opening of the laminate chamber is disposed generally perpendicular to the first chambers.

11. The apparatus of claim 1 further comprising:

at least one second chamber, each second chamber including:

a width;

a length;

a thickness;

an input; and

at least one output disposed immediately proximate to at least one first chamber output, wherein each second chamber output is in communication with the laminate chamber.

12. The apparatus of claim 1 further comprising:

at least two generally parallel second chambers, each second chamber including:

a width;

a length;

a thickness;

an input; and

at least one output disposed immediately proximate to at least one first chamber output, wherein each second chamber output is in communication with the laminate chamber.

13. The apparatus of claim 12 wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

wherein the height of the output for each first chamber is incrementally smaller from each first chamber to an adjacent first chamber output aperture along the height dimension of the interleaving block;

a plurality of seconds defined by each second chamber output and the laminate chamber; and

wherein each second distance varies incrementally from one second chamber output to an adjacent second chamber output at a corresponding point along the width of each output.

14. The apparatus of claim 13 wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each second distance increases from a top second chamber to a bottom second chamber.

15. The apparatus of claim 12, wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

a second distance extending between each second chamber output and the laminate chamber; and

wherein the second distance for each second chamber output aperture incrementally changes along the height dimension of the interleaving block from each second chamber output to an adjacent second chamber output aperture at corresponding points of each output aperture.

16. The apparatus of claim 15, wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each corresponding second distance increases from a top second chamber to a bottom second chamber.

17. The apparatus of claim 12 wherein the interleaving block further comprises:

a top side and a bottom side defining a height dimension;

wherein the width of each second chamber is disposed generally perpendicular with respect to the height dimension of the interleaving block; and

wherein each output height for each second chamber is incrementally smaller from each second chamber output to an adjacent second chamber output along the height dimension of the interleaving block.

18. The apparatus of claim 17 wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each output incrementally decreases in height from a top second chamber to a bottom second chamber.

19. The apparatus of claim 12 wherein each second chamber is in communication with a common supply.

20. The apparatus of claim 12 wherein the laminate chamber is disposed generally perpendicular to the width of the second chambers.

21. The apparatus of claim 12 wherein each output defines a series of third distances from the input to points along the output, and a series of fourth distances extending between points along the output and the laminate chamber such that as the third distance increases from the input to points along the output, the fourth distance decreases in length.

22. The apparatus of claim 12 wherein flowable material introduced at the input aperture of each second chamber exits the second chamber through the output aperture of each second chamber at a substantially constant flow rate at any point along the width of the output aperture.

23. The apparatus of claim 12 wherein the laminate chamber further comprises:

an extrudate aperture, wherein width dimension of the extrudate aperture and the width dimension of at least one of the second chamber output apertures are substantially the same.

24. The apparatus of claim 12 wherein the output of each second chamber further comprises:

a plurality of openings disposed intermittently along the width defined by the first chambers, each opening being in communication with the laminate chamber.

25. The apparatus of claim 24 wherein the interleaving block further comprises:

a top side and a bottom side defining a height dimension, wherein the width of each first and second chamber is disposed generally perpendicular to the height dimension of the interleaving block;

wherein the thickness of the output aperture for each first chamber is incrementally smaller than the output aperture any first chamber disposed immediately adjacent and more proximate to the bottom side; and

wherein the distance between each second chamber output and the laminate chamber is incrementally shorter than any second chamber disposed immediately adjacent and more proximate to the bottom side.

26. The apparatus of claim 24 wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension; and

wherein the height of the output for each second chamber is incrementally smaller from each second chamber to an immediately adjacent second chamber output aperture along the height dimension of the interleaving block.

27. The apparatus of claim 26 wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each second chamber output height increases from a top second chamber to a bottom second chamber.

28. The apparatus of claim 24 wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

wherein the width of each second chamber is disposed generally perpendicular with respect to the height dimension of the interleaving block; and

wherein the height of the output aperture for each second chamber is incrementally smaller from one second chamber output aperture to an adjacent first chamber output aperture.

29. The apparatus of claim 28, wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each output aperture incrementally decreases in height from a top first chamber to a bottom first chamber.

30. The apparatus of claim 24, wherein the first chambers are configured to receive a matrix material, and the second chambers are configured to receive a fiber material.

31. The apparatus of claim 24, wherein the interleaving block portion further comprises:

a top side and a bottom side defining a height dimension;

a second distance extending between each second chamber output and the laminate chamber; and

wherein the second distance for each second chamber output aperture incrementally changes along the height dimension of the interleaving block from each second chamber output to an adjacent second chamber output aperture at corresponding points of each output aperture.

32. The apparatus of claim 31, wherein an output of the laminate chamber is disposed proximate to the bottom side of the interleaving block and each corresponding second distance increases from a top second chamber to a bottom second chamber.

33. An apparatus comprising:

an interleaving block portion including:

a series of first chambers each having outputs, the first chambers configured so as to contain a matrix material, wherein each first chamber acts to spread the matrix material to a pre-determined width, and constant thickness at each output;

a series of second chambers configured so as to contain a fiber material, wherein the second chambers have a plurality of outputs disposed intermittently along the pre-determined width; and

a die portion including a laminate chamber disposed generally perpendicular with respect to the series of first and second chambers in communication with the outputs of each first and second chambers and in communication with the outputs of each first and second chamber, wherein the die portion combines the matrix material and the fiber material so as to form extrudate at the pre-determined width.

34. A method for extruding a multi-layer extrudate comprising:

moving a material through a plurality of generally parallel first chambers each first chamber having a length dimension, the first chambers being generally parallel along the length dimension in an interleaving block;

moving the material through at least one output into a laminate chamber having a height dimension perpendicular to the length dimension of the first chambers;

layering the material in the laminate chamber; and

extruding the layered material from an output disposed at one end of the height dimension of the laminate chamber.

35. The method of claim 34, and further comprising:

moving a fiber material through at least one second chamber having a length dimension substantially parallel to the length dimensions of the first chambers;

moving the fiber material through multiple output openings individually in communication with each chamber; and

layering the fiber material in the laminate chamber.